Modernization Project Teams Need to Follow Key Systems Development Processes

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INSPECTOR GENERAL
for TAX
ADMINISTRATION

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MEMORANDUM FOR DEPUTY COMMISSIONER FOR MODERNIZATION &
                        CHIEF INFORMATION OFFICER

FROM: Pamela J. Gardiner
                           Deputy Inspector General for Audit

SUBJECT: Final Audit Report - Modernization Project Teams Need
                           to Follow Key Systems Development Processes
                           (Audit # 200120025)

The attached report presents the results of our review of issues identified during our audits of four Business Systems Modernization (BSM) projects in Fiscal Year 2001. The overall objective of this review was to summarize issues and trends in the implementation of key business systems development processes.

In summary, we found that the BSM Office has made progress in establishing critical processes to guide modernization project development. However, it needs to strengthen some processes, and it needs to fully implement others to enable the project teams to effectively and efficiently meet project goals and objectives. These processes include business requirements development, configuration management, risk management, and accounting for costs associated with the BSM process.

Management's Response: Management's response was due on November 8, 2001. As of November 14, 2001, management had not responded to the draft report.

Copies of this report are also being sent to managers who are affected by the report recommendations. Please contact me at (202) 622-6510 if you have questions or Scott E. Wilson, Assistant Inspector General for Audit (Information Systems Programs), at (202) 622-8510.

Attachment

"200120025 Final
Report Presentation.

TIGTA

Modernization Project Teams Need to Follow
Key Systems Development Processes

November 2001

Presentation Overview

- Introduction
- Audit Objective
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Introduction

- The Internal Revenue Service (IRS) is in the process of modernizing its information technology systems. This effort is known as Business Systems Modernization (BSM).
- The IRS formed the BSM Office to manage the BSM effort and to oversee the work of the PRIME Alliance, a group of contractors headed by Computer Sciences Corporation (CSC).
- The BSM Office and CSC have adopted a structured systems development process called the Enterprise Life Cycle (ELC), which provides the key processes and disciplines needed to successfully deliver BSM.

Audit Objective

The overall objective of this review was to summarize issues and trends in the implementation of key systems development processes. These issues were identified in four modernization projects through audits conducted by the Treasury Inspector General for Tax Administration (TIGTA).

- Customer Communications 2001 Release (CC01) - upgrades the IRS' telephone communications system to more efficiently and effectively handle taxpayers' calls.
- Telecommunications Enterprise Strategic Program (TESP) - provides the telecommunications needs for modernization projects and develops a long-term IRS telecommunications strategy.

Audit Objective

- E-Services - provides the means for tax practitioners and other authorized parties to conduct business electronically with the IRS.
- Customer Relationship Management - Examination (CRM Exam) - assists revenue agents to more efficiently and accurately compute complex corporate taxes.

Summary of Review

- The BSM Office has established processes to guide the modernization projects.

- However, it needs to strengthen some processes, and it needs to fully implement others to enable the project teams to effectively and efficiently meet the project goals and objectives.

- Attempting to develop modernized information systems without implementing key BSM processes will cause systems to continue to experience cost, schedule, and performance shortfalls. These issues increase as projects move from planning into design and development.

Summary of Review

- To help BSM project teams meet goals and objectives, the BSM Office should:

  ? Include requirements management in the early ELC phases.

  – Ensure the revised configuration management procedures are implemented and perform regular configuration management inspections.

  – Ensure revisions to risk management procedures are completed and implemented.

Summary of Review

– Continue plans for implementing Treasury-wide human resources software (HR Connect) while establishing an interim method to track and estimate IRS costs associated with modernization projects.

Background

- The ELC is used to plan and manage work throughout BSM.

  – The ELC establishes a set of repeatable processes and a system of reviews, checkpoints, and milestones to reduce risks during system development.

  – The ELC and its processes are designed to help ensure that modernization projects are properly planned, designed, developed, and implemented.

  – All personnel involved in systems modernization projects are required to follow the ELC.

Scope of Review

- Audit teams performed fieldwork for the four project audits in the IRS' Headquarters Office and the BSM Office in New Carrollton, MD.

- These audits were conducted between February 2000 and March 2001, in accordance with *Government Auditing Standards*.

- This report includes analyses of the results of these audits and the IRS' feedback to the conditions identified.

Methodology

To accomplish the objective, TIGTA:

- Reviewed and analyzed project documentation, TIGTA audit reports and related working papers, and relevant BSM program guidelines and procedures.

- Interviewed BSM managers and staff, CSC personnel, and TIGTA audit managers and audit staff.

- Relied on information and documentation obtained by the BSM Office from the CSC to complete some analyses.

Results

- Project teams did not follow all critical systems development processes to help projects meet objectives. Specifically, strengthening and/or implementing aspects of the following key processes will increase the likelihood of BSM program success:

  ? Requirements development.
  ? Configuration management.
  ? Risk management.
  ? Accounting for IRS costs associated with BSM.

- These process weaknesses contributed to cost increases, schedule delays, and performance shortfalls in the development of all four projects reviewed.

Results

The following table presents the delays and increased costs from the original estimates in the BSM projects reviewed by TIGTA. These delays and cost escalations resulted in part because of incomplete and/or untimely system development processes.

Project	Delay	Increased Cost
CC 2001	3 Months	$4,997,000
CRM Exam	7 Months	$2,556,000
TESP	7 Months	$3,051,000
E-Services	9 Months	$13,364,000

Results

Business Requirement Identification Was Not Completed Before Entering the Project Development Process

- Project managers:

  – Did not identify significant business requirements as early as needed.

  – Added and/or changed business requirements during the project development phase.

Results

- ELC and Project Management Institute guidelines provide for up-front identification and early management of project business requirements.

- Absence of proper requirements management on these four projects contributed to:

  – Increased costs.

  – Project delays.

  – Risk that systems could be developed that may not meet the needs of the business processes they are intended to support.

Results

Initial Identification of Project Requirements

- In the CC01 project, security requirements were not identified until after the project architecture phase.

- In the CRM Exam project, a requirement to determine the number of revenue agents who needed the new software was not identified until the late stages of the development phase.

Results

Additions to Project Requirements

- Additional e-Services requirements to expand Internet access and integrate project capabilities with other BSM projects were not introduced until presentation of the Baseline Business Case to the Executive Steering Committee.

Changes in Project Requirements

- The decision to integrate the CRM Exam project with other systems was reversed at the exit of the project design phase. The IRS later decided to reinstate system integration. It is currently considering excluding integration again.

Management Actions

- The BSM Office is refining the roles and responsibilities of a new Sub-Executive Steering Committee, and its Chairperson, Enterprise Process Owner and Business Requirements Director. These refinements intend to increase emphasis and timeliness of requirements development.

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Recommendation

To meet the business process objectives for the BSM projects, the Deputy Commissioner for Modernization & Chief Information Officer should:

1. Direct the BSM project teams to identify and incorporate business requirements that meet customer needs prior to entering the development phase. To help ensure that business process objectives are met, project managers should follow the Project Management Institute's guidance for developing a Business Requirements Management Plan.

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Recommendation (continued)

The Business Requirements Management Plan should include an assessment of the expected stability of the business requirements and clearly explain how to identify and classify changes.

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Management's Response

1. Management's response was due on November 8, 2001. As of November 14, 2001, management had not responded to the draft report.

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The Business Systems Modernization Office Did Not Ensure Implementation of Configuration Management Processes

- While project managers developed configuration management plans, the BSM Office did not ensure the CSC fully implemented the processes in those plans. The CSC did not:

  - Establish baselines on critical project documents.
  - Restrict access to the configured item storage area.
  - Implement adequate procedures to manage configuration changes.

Results

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- The ELC requires that all BSM projects properly control configuration items and follow configuration management guidelines.

- If configuration management procedures and baselines on critical project documents are not effectively implemented, the BSM Office cannot assure that the systems under development will provide the intended capabilities. Confusion could occur within the project team about which requirements documents to use in coding system modules. Ultimately, inconsistent processes could result in a lack of overall system integration at the program level.

Results

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Baselines were not properly established and controlled

- The CSC did not properly establish and control baselines for project documentation as required by configuration management procedures.

  – Several versions of documents were maintained in the configuration items storage area. However, the baseline files were not separately identifiable.

Results

Access to the storage areas was not restricted

- The configured items storage areas were in the form of "shared electronic project drawers" and were read/write accessible to anyone on the CSC or IRS project teams.

- CSC did not institute controls over the versions of key documents that had been accepted and signed by the IRS.

Results

Change management was not properly implemented

- Change management procedures were not properly implemented to ensure that changes to configured items were approved and tracked.

  - These procedures require preparation and approval of change requests by the Configuration Control Board when modifications or additions are proposed to baseline documents.

Results

- Configuration management weaknesses went undetected because:

    - The BSM Office oversight reviews did not initially include project-level processes and procedures.
    - The CSC did not conduct baseline reviews of the projects and it cancelled other project level inspections.

Results

Management Actions

- The BSM Office issued a report in February 2001 on the absence of effective contractor configuration management processes.

- During our review, both the IRS and CSC initiated corrective actions regarding configuration management processes.

- The Deputy Commissioner for Modernization & Chief Information Officer is in the process of implementing Configuration Management Program Instructions.

Recommendation

To ensure the revised configuration management processes are implemented, the Deputy Commissioner for Modernization & Chief Information Officer should:

2. Require the BSM Office to perform regular program-level configuration management inspections to monitor the adequacy of the implementation and execution of the configuration management procedures.

The Business Systems Modernization Office Did Not Effectively Implement Risk Management Processes

- The ELC Joint Risk Management Procedure, dated June 30, 2000, made risk management of modernization projects a joint responsibility of the CSC and the BSM Office.

- However, the CSC and the BSM Office have not adequately implemented risk management procedures.

Results

- The risk management process did not include:

  - Risk management plans with tolerance levels that could trigger risks or issues for management attention.

  - Fully developed risk mitigation plans and issue statements.

  - A centralized risk and issue tracking system to identify program-wide risks and issues.

Results

- Without an effective risk and issue management system, the CSC and the BSM Office cannot readily identify, analyze, track, and report the status or disposition of risks or issues for modernization projects.

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Risk management plans did not include tolerance levels to trigger risks or issues

- The ELC Joint Risk Management Procedure states that tolerances should be established for cost and schedule variances that would systemically generate risks and issues.

- By monitoring specified variances, management can determine whether a risk is going to occur and take action to mitigate it before it affects the project or program.

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Risk mitigation plans and issue statements were not fully developed

- Risk mitigation plans did not ensure that risks were properly controlled.

  – Risk reduction activities were not always performed timely.

  – Risk reduction activities were not always initiated before risk impact dates.

  – Risks were not always treated as issues when risk impact dates passed.

Results

- Issue statements did not include enough information for CSC and IRS personnel to plan and take appropriate actions.

- Best practices indicate that the BSM Office ensure that diligent risk monitoring is in place and mitigation plans are developed related to the severity of the risk.

Results

A centralized risk and issue tracking system to identify program-wide risks and issues was not in place

- Although the CSC rolled out a version of the Item Tracking System (ITS) in September 2000, project staffs were not required to post all the risks and issues to the ITS database. As a result, the database was not accurate because it did not contain all risk information.

- The ELC requires all projects to use a risk management tool (ITS) when available.

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Specifically, ITS concerns include:

• Inconsistent and ambiguous information reported on both the Risk Inventory Assessment Worksheet and Risk Mitigation Strategy Worksheet.

• Not including all risk dependencies from modernization projects into the risk database. Also, costs and schedule impacts associated with each risk have not been reported on the worksheets.

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Management Actions

- In June 2001, the BSM Office hired an executive to oversee the risk management process and create a Process Action Team to review, document, and refine risk management procedures. The process under development will include procedures to identify, track, and mitigate risks. The process was scheduled for implementation in August 2001.

- The BSM Office made enhancements to the ITS to eliminate errors and enhance usability. A users guide was issued mandating standardized usage by all projects.

Results

Recommendations

To ensure the risk management process is working as intended, the Deputy Commissioner for Modernization & Chief Information Officer should:

3. Consider further improvements to the ITS by linking it with BSM project work breakdown structures. These links would allow notification of potential risks when predetermined tolerances are reached, and track subsequent mitigation efforts.

4. Increase emphasis on identifying, analyzing, tracking, and mitigating risks at the BSM program level.

Results

The Business Systems Modernization Office Does Not Accurately Account for IRS Costs Associated with Modernization Projects

- While the BSM Office tracks and monitors contractor costs, it has not established a means to accurately track and report the IRS labor, hardware and software maintenance costs associated with modernization projects.

- The IRS incurs substantial costs in addition to the contractors' costs to support BSM project delivery.

Results

- IRS labor costs associated with BSM:

  – The IRS captures labor cost estimates through its accounting and timekeeping processes. System restrictions, such as decentralized input control points, make these estimates inaccurate. For example, the IRS estimated $200,000 in labor costs associated with the e-Services project from October 1999 through January 2001. The TIGTA's analysis of IRS personnel assigned to this project estimated an additional $1.6 million of IRS labor costs during this period.

Results

- IRS hardware and software maintenance costs associated with BSM:

  – The IRS does not associate all hardware and software maintenance costs with BSM projects. For example, costs of $100,000 to install telecommunications lines from an IRS Office to a CSC office for BSM project development were not associated with BSM program costs.

  – BSM project hardware and software maintenance costs are significant - CC01 projected $1.3 million in hardware and software maintenance through September 2001.

Results

- Improved tracking of IRS modernization costs is needed to provide:

  - Accurate accounting of current program costs and "Earned Value" assessments.
  - Relevant status reports to program stakeholders including the Congress, Treasury, and Office of Management and Budget.
  - Reliable data for use in future budget considerations.

Results

Management Actions

- The BSM Office indicated that it is working with the Chief Financial Officer to acquire software to enable tracking and reporting of IRS costs associated with modernization projects.

TIGTA

Recommendations

To enable more accurate cost tracking, the Deputy Commissioner for Modernization & Chief Information Officer should:

5. Establish an interim method of developing reliable estimates of IRS costs associated with modernization projects.

6. Continue working with the Chief Financial Officer to implement the Treasury-wide human resources software, HR Connect.

Glossary

Baselines - A baseline consists of a specified set of documents, software, and other items defined as final (or point-in-time) products for a project. A baseline establishes a predefined point from which to evaluate project progress.

Business Requirements Director - A member of the Infrastructure Sub-Executive Steering Committee (ESC) who is charged with ensuring business requirements for a specific modernization project or related group of projects are adequately developed and managed.

Configuration Item - A document or piece of hardware or software that is designated for configuration management and treated as a single entity in the configuration management process.

Configuration Management - A discipline applying technical and administrative direction and surveillance to identify and document the functional and physical characteristics of a configuration item, control changes to those characteristics, record and report change processing and implementation status, and verify compliance with specified requirements.

Glossary

Configuration storage area - An area used for storage and control of configuration items.

Earned Value - Earned value is a management technique which measures actual cost and work accomplished against the budgeted cost and planned work scheduled. Variances between these actual and planned factors are analyzed and provided to management for decision-making.

Enterprise Life Cycle (ELC) - The ELC defines the processes, products, techniques, roles, responsibilities, policies, procedures, and standards associated with planning, executing, and managing the Internal Revenue Service's (IRS) business change.

Enterprise Process Owner - An IRS Information Technology Services executive and member of the Infrastructure Sub-ESC who is responsible for working with the Business Operating Divisions to coordinate decisions for a modernization project or related group of projects.

HR Connect - The new Human Relations software the IRS plans to use to account for employee time charges.

Requirements management - Development of and control over agreed-upon system parameters and characteristics that meet agreed upon customer needs and product designs.

Risk management - The systemic process of identifying, analyzing, and responding to project risk. Project risk is an uncertain event that, if it occurs, will adversely affect the ability of the project to meet its objectives.

Project Management Institute (PMI) - The PMI is the world's leading not-for-profit project management professional association. The PMI provides global leadership in the development of standards for the practice of the project management profession throughout the world. PMI's premiere standards document, *A Guide to the Project Management Body of Knowledge*, is a globally recognized standard for managing projects in today's marketplace.

Related TIGTA Audit Reports

- *Progress in Developing The Customer Communications Project Has Been Made, But Risks to Timely Deployment in 2001 Still Exist* (Reference Number 2001-20-055, dated March 2001).

- *The Customer Relationship Management Examination Project Experienced Delays and Increased Costs, But Lessons Learned Should Improve Future Modernization Projects* (Reference Number 2001-20-140, dated September 2001).

- *The Telecommunications Modernization Project Provided Some Benefits, But Process Improvements Are Needed for Future Projects* (Reference Number 2001-20-143, dated September 2001).

- *Improvements Are Needed in the Management of the e-Services Project to Enable Timely Progress Towards Future Goals* (Reference Number 2001-20-144, dated September 2001).

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